

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (currently amended) A fin actuator(s), in a portable missile, that substantially limits backlash, comprising:
 - means for rotating a power shaft, said means for rotating operatively configured to rotate said power shaft in a forward direction and a reverse direction, said means for rotating being constrained from free movement by an actuator housing;
 - means for converting rotational movement of said power shaft to linear movement, wherein said means for converting rotational movement of said power shaft includes a lead screw fixedly coupled to said power shaft, said lead screw having a lead nut threadingly engaged and moving linearly along said lead screw in relation to the direction of rotation of said power shaft; and
 - means for converting said linear movement of said lead nut to rotational movement of a fin shaft, wherein said means for converting said linear movement includes said lead nut operatively coupled to a crank arm including slots to allow freedom of movement, said crank arm fixedly coupled to said fin shaft, effecting the rotation of said fin shaft according to the linear movement of said lead nut.
2. (currently amended) The actuator(s) of claim 1, wherein said means for rotating a power shaft comprises a reversible electric motor.
3. (currently amended) The actuator(s) of claim 1, wherein said lead screw, said lead nut, and said crank arm are so constructed and coupled as to limit the total backlash of said actuator(s) measured at said fin shaft to less than about 0.1 degrees.

4. (currently amended) The actuator(s) of claim 1, wherein said actuator(s) is dimensioned and configured to fit in said portable missile of less than about 5 lbs.
5. (currently amended) The actuator(s) of claim 1, wherein said actuator(s) is dimensioned and configured to fit in an actuator section of said portable missile of less than about 2 inches in diameter.
6. (currently amended) The actuator(s) of claim 1, wherein said actuator(s) is dimensioned and configured to fit in an actuator section of said portable missile of less than about 3 inches in length.
7. (currently amended) The actuator(s) of claim 1, wherein said actuator(s) is dimensioned and configured to provide at least about 50 oz-in of torque to said fin shaft.
8. (currently amended) The actuator(s) of claim 1, wherein said actuator(s) is dimensioned and configured to provide from at least about -20 degrees to at least about +20 degrees of deflection of said fin shaft.
9. (currently amended) The actuator(s) of claim 1, wherein said crank arm and said fin shaft is are a unitary structure.
10. (currently amended) A method for fin actuation(s), in a portable missile, that substantially limits backlash, comprising:
 - providing a means for rotating a power shaft, said means for rotating operatively configured to rotate said power shaft in a forward direction and a reverse direction, said means for rotating being constrained from free movement by an actuator housing;
 - providing a means for converting rotational movement of said power shaft to linear movement, wherein said means for converting rotational movement of said power shaft includes a lead screw fixedly coupled to said power shaft, said lead screw having a lead nut

threadingly engaged and moving linearly along said lead screw in relation to the direction of rotation of said power shaft; and

providing a means for converting said linear movement of said lead nut to rotational movement of a fin shaft, wherein said means for converting said linear movement includes said lead nut operatively coupled to a crank arm including slots to allow freedom of movement, said crank arm fixedly coupled to said fin shaft, effecting the rotation of said fin shaft according to the linear movement of said lead nut.

11. (original) The method of claim 10, wherein said means for rotating a power shaft comprises a reversible electric motor.
12. (original) The method of claim 10, wherein said lead screw, said lead nut, and said crank arm are so constructed and coupled as to limit the total backlash measured at the fin shaft to less than about 0.1 degrees.
13. (currently amended) The method of claim 10, wherein said fin actuation(s) occurs within a portable missile of less than about 5 lbs.
14. (currently amended) The method of claim 10, wherein said fin actuation(s) occurs within an actuator section of said portable missile of less than about 2 inches in diameter.
15. (currently amended) The method of claim 10, wherein said fin actuation(s) occurs within an actuator section of said portable missile of less than about 3 inches in length.
16. (currently amended) The method of claim 10, wherein said fin actuation(s) provides at least about 50 oz-in of torque to said fin shaft.
17. (currently amended) The method of claim 10, wherein said fin actuation(s) provides from at least about -20 degrees to at least about +20 degrees of deflection of said fin shaft.

18. (currently amended) The method of claim 10, wherein said crank arm and said fin shaft is
are a unitary structure.

19. (currently amended) A fin actuator(s), in a portable missile, that substantially limits backlash, comprising:

a reversible electric motor for rotating a power shaft, said power shaft extending from said motor; said motor being constrained from free movement by an actuator housing;

a lead screw fixedly coupled to said power shaft, said lead screw having a lead nut threadingly engaged and moving linearly along said lead screw in relation to the direction of rotation of said power shaft; and

said lead nut operatively coupled to a crank arm including slots to allow freedom of movement, said crank arm fixedly coupled to a said fin shaft, effecting the rotation of said fin shaft according to the linear movement of said lead nut.

20. (currently amended) The actuator(s) of claim 19, wherein said lead screw, said lead nut, and said crank arm are so constructed and coupled as to limit the total backlash of said actuator(s) measured at said fin shaft to less than about 0.1 degrees.

21. (currently amended) The actuator(s) of claim 19, wherein said actuator(s) is dimensioned and configured to fit in said portable missile of less than about 5 lbs.

22. (currently amended) The actuator(s) of claim 19, wherein said actuator(s) is dimensioned and configured to fit in an actuator section of said portable missile of less than about 2 inches in diameter.

23. (currently amended) The actuator(s) of claim 19, wherein said actuator(s) is dimensioned and configured to fit in an actuator section of said portable missile of less than about 3 inches in length.

24. (currently amended) The actuator(s) of claim 19, wherein said actuator(s) is dimensioned and configured to provide at least about 50 oz-in of torque to said fin shaft.

25. (currently amended) The actuator(s) of claim 19, wherein said actuator(s) is dimensioned and configured to provide from at least about -20 degrees to at least about +20 degrees of deflection of said fin shaft.

26. (currently amended) The actuator(s) of claim 19, wherein said crank arm and said fin shaft is are a unitary structure.

Amendments To The Drawings

The attached sheet of drawings includes changes to Fig. 1. This sheet, which includes Fig. 1, replaces the original sheet including Fig. 1. In Fig. 1 an element has been labeled with a number.

Attachments: Replacement sheet
 Annotated sheet showing changes.